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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
ISLA RODAS, RICHARD	

ART UNIT	PAPER NUMBER
2829	

DATE MAILED: 11/28/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/533,793	TEULINGS ET AL.	
	Examiner	Art Unit	
	Richard Isla-Rodas	2829	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *13 September 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *14-33* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *14-24, 26-33* is/are rejected.

7)☒ Claim(s) *25* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *28 August 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 33 recites the limitation "the transistor bridge" in line 9. There is insufficient antecedent basis for this limitation in the claim.

Claim Objections

2. While features of an apparatus may be recited either structurally or functionally, claims directed to an apparatus must be distinguished from the prior art in terms of structure rather than function. *In re Schreiber*, 128 F.3d 1473, 1477-78, 44 USPQ2d 1429, 1431-32 (Fed. Cir. 1997) (The absence of a disclosure in a prior art reference relating to function did not defeat the Board's finding of anticipation of claimed apparatus because the limitations at issue were found to be inherent in the prior art reference); see also *In re Swinehart*, 439 F.2d 210, 212-13, 169 USPQ 226, 228-29 (CCPA 1971); *In re Danly,* 263 F.2d 844, 847, 120 USPQ 528, 531 (CCPA 1959). "Apparatus claims cover what a device *is*, not what a device *does*." *Hewlett-Packard Co. v. Bausch & Lomb Inc.*, 909 F.2d 1464, 1469, 15 USPQ2d 1525, 1528 (Fed. Cir. 1990) (emphasis in original). See MPEP § 2114. Therefore, the functional recitations that accompany several claims in this application cannot be considered as limiting over prior art that anticipates all of the claimed structural limitations, either as a whole or in a combination.

3. Claim 19 is objected to because the *"low value"* of the voltage level, as recited in line 3 isn't clear. For the purpose of examining the claim it will be assumed the applicant meant *"a low value equal to a zero voltage level."* Appropriate correction is required.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claim 28 is rejected under 35 U.S.C. 102(b) as being anticipated by the US Patent to Lenhard et al. (6,713,999).

As to claim 28, Lenhard et al. shows in Figure 1, a device, comprising a sensor (7) sensing a direction of a magnetic field prevailing in the air gap of a transformer, there being a first electric current (Ip) of a first magnetic field (M1) having a first direction and generated by a primary winding (2) of the transformer, the measured first electric current being balanced by a second magnetic field (M2) of second direction opposite the first direction and generated by a secondary winding (5+6) of the transformer in which a second compensating current (compensating current flowing through secondary winding, see lines 10-19 in column 1) flows, the magnetic field in the air gap being a field resulting from an addition of the first and second magnetic fields (see lines 21-22 in column 6), the sensor (7) configured to regulate said compensating current (see lines

10-19 in column 1) in closed loop mode by the sensor (7) sensing only a direction of said resultant field and controlling a reversal of a direction of circulation of the compensating current (see lines 21-22 in column 6) in said secondary winding (5+6), the sensor being sensitive only to the direction of said resultant magnetic field (see lines 21-22 in column 6).

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 14, 15, 16, 23, 24, 26, 27 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over the US Patent to Lenhard et al. (6,713,399) in view of the US Patent to Gary (4,639,665).

In terms of claim 14, Lenhard et al. shows in Figure 1, a device for measuring a electric current, comprising a sensor (7) sensitive to a direction of a magnetic field prevailing in a core (3) of a transformer (1) having a first electric current (Ip) of a first magnetic field (M1) of a first direction generated by a primary winding (2) of the transformer, the transformer having the first electric current balanced by a second magnetic field (M2) of second direction opposite the first direction and generated by a secondary winding (5+6) of the transformer in which a second compensating current (compensating current flowing through secondary winding, see lines 10-19 in column 1)

flows, the magnetic field being a field resulting from an addition of the first and second magnetic fields (see lines 21-22 in column 6), the sensor (7) configured to regulate said compensating current in closed loop mode by the sensor (7) sensing only a direction of said resultant magnetic field (see lines 21-22 in column 6) and controlling a reversal of a direction of circulation of the compensating current (see lines 25-27 in column 1) in said secondary winding (5+6), the sensor being sensitive only to the direction of said resultant magnetic field (see lines 21-22 in column 6). Lenhard et al. teach all of the claimed elements as discussed above except for the sensor being located in the air gap of the core (3) of the transformer. However, it will be understood that Figure 1 is a graphical interpretation of the detailed structure of the device. Although Lenhard et al. is silent about the location of the sensor, it is well known in the art to place a field sensor in an air gap of a transformer's core. Gary (4,639,665) for instance, shows in Figure 1, a sensing apparatus in which the sensor (12) is positioned in the air gap of a core (13b+13a). It would have been obvious to one of ordinary skill in the art, at the time the invention was made, to use the teachings of field sensors placed in the air gap of a core, as disclosed by Gary to place the field sensor (7) in Lenhard et al. device in an air gap of the core (3) in the device shown in Figure 1, in order to utilize the core's conductivity to transmit the magnetic fields generated by the coils towards the surface of the sensor.

As to claim 15, Lenhard et al. shows in Figure 1, an electrical power supply (V+, V-, 13, 14, 9 and 10) connected to the secondary winding, and further comprising

transistors (13) configured as an H-configuration transistor bridge and freewheeling diodes (14)

As to claim 16, Lenhard et al. shows in Figure 1, a controller (8) connected to the transistor bridge and to an output signal of the sensor (7), the controller arranged to provide closed loop mode regulation of current flowing in the secondary winding (the controller determined which switch 13-14 to turn on in order to control the current through windings 5 and 6 in a closed loop), the controller being controlled the probe.

As to claim 23, Lenhard et al. discloses the claimed invention except for mentioning the inherent virtue of the core (3) being a ferromagnetic material. It would have been obvious to one having ordinary skill in the art at the time of the invention was made to use a core with ferromagnetic material in order to conduct magnetic fields, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. In re Leshi, 125 USPQ 416.

As to claim 24, Lenhard et al. shows in Figure 1, a measurement resistor (19). While features of an apparatus may be recited either structurally or functionally, claims directed to an apparatus must be distinguished from the prior art in terms of structure rather than function. Therefore, the recitation *"to obtain a value of the first current i1 through a measurement of the second compensating current i2"* is not given patentable weight as all structural limitations are anticipated by the prior art.

As to claim 26, Lenhard et al. shows in Figure 1, an H-configuration transistor bridge (13), positioned in a power supply (V+, V-, 13, 14, 9 and 10) and a controller (8).

As to claim 27, it has been held that a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations. *Ex parte Masham, 2 USPQ F.2d 1647 (1987).* Therefore, the limitation *"wherein said device is an automotive electronic"* is not considered limiting.

As to claim 32, Enhard et al. shows in Figure 1, a device comprising a probe (7) sensing a direction of a magnetic field prevailing in a transformer, the transformer having a first electric current (Ip) of a first magnetic field (M1) with a first direction and generated by a primary winding (2) of the transformer, the measured first electric current being balanced by a second magnetic field of second direction opposite the first direction and generated by a secondary winding (5+6) of the transformer in which a second compensating current (compensating current flowing through secondary winding, see lines 10-19 in column 1) flows, the magnetic field in the air gap being a field resulting from an addition of the first and second magnetic fields (see lines 21-22 in column 6), the probe (7) configured to regulate said compensating current in closed loop mode by the probe sensing, the probe being sensitive only to the direction of said resultant magnetic field (see lines 21-22 in column 6) and controlling a reversal of a direction of circulation of the compensating current (see lines 25-27 in column 1) in said secondary winding, an electrical power supply (V+, V-, 13, 14, 9 and 10) connected to the secondary winding, the power supply comprising transistors (13, 14) and a controller (8) connected to the power supply and connected to an output signal ($Q \cdot \overline{Q}$) of the probe, the controller arranged to provide closed loop mode regulation of current flowing

in the secondary winding (the controller determined which switch 13-14 to turn on in order to control the current through windings 5 and 6 in a closed loop), the controller being controlled the probe. Lenhard et al. teach all of the claimed elements as discussed above except for the sensor being located in the air gap of the core (3) of the transformer. However, it will be understood that Figure 1 is a graphical interpretation of the detailed structure of the device. Although Lenhard et al. is silent about the location of the sensor, it is well known in the art to place a field sensor in an air gap of a transformer's core. Gary (4,639,665) shows in Figure 1, a sensing apparatus in which the sensor (12) is positioned in the air gap of a core (13b+13a). It would have been obvious to one of ordinary skill in the art, at the time the invention was made, to use the teachings of field sensors placed in the air gap of a core, as disclosed by Gary to place the field sensor (7) in Lenhard et al. device in an air gap of the core (3) in the device shown in Figure 1, in order to utilize the core's conductivity to transmit the magnetic fields generated by the coils towards the surface of the sensor.

8. Claims 19-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over the US Patent to Lenhard et al. (6,713,999) in view of the US Patent to Gary (4,639,665) further in view of the US Patent to Muller (4,535,275).

In terms of claim 19, Lenhard et al. in view of Gary and further in view of Hatanaka teach all of the claimed elements as discussed above except for the sensor output being a square wave. However, it is well known in the art to use Hall sensors that output square waves when such sensors are connected to transistors. For

instance, Muller teaches in lines 9-15 of column 6, a hall element connected to transistors (as is the case in Lenhard et al. device) providing a square wave pulse that switches each transistor on or off. The "high" and "low" in the square wave, may also be termed 1-signal and 0-signal for convenience. It would have been obvious to one of the ordinary skill in the art, at the time of the invention, to use the teachings of square waves outputted from hall sensors as disclosed by Muller to use a square waveform at the output of the sensor in Lenhard et al. device in order to conveniently turn on and off the transistors using "high" and "low" signals (also termed 1 and 0) which are easier to interpret and more defined than sinusoidal waveforms. As mentioned before, while features of an apparatus may be recited either structurally or functionally, claims directed to an apparatus must be distinguished from the prior art in terms of structure rather than function. Therefore, the functional limitations (parts i and ii) is not given patentable weight since the prior art anticipates all of the claimed structure.

As to claims 20-21, it must be noted that while features of an apparatus may be recited either structurally or functionally, claims directed to an apparatus must be distinguished from the prior art in terms of structure rather than function. Consequently the functional recitation is not given patentable weight since the prior art anticipates all of the claimed structure.

As to claim 22, Lenhard et al. shows in Figure 1, a measurement resistor (19) placed in series with the secondary winding.

9. Claims 17 and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over the US Patent to Lenhard et al. (6,713,999) in view of the US Patent to Gary (4,639,665) further in view of the US Patent to Hatanaka (6,727,684).

In terms of claim 17, Lenhard et al. in view of Gary teach all of the claimed elements except for the sensor being a bipolar Hall effect probe. Hatanaka teaches in lines 40-48 of column 1, that if a magnetic field sensor is capable of determining magnetic field density irrespective of magnetic polarity (bipolar) of a magnet (or electromagnet), then is no longer necessary to manage the direction of the magnet when determining the position of the magnet. It would have been obvious to one of the ordinary skill in the art, at the time of the invention, to use the teachings of bipolar magnetic sensors as disclosed by Hatanaka to use a bipolar magnetic sensor (probe) in the device disclosed by Lenhard et al. in order to determine a magnetic field irrespective of the polarity of a magnet (or electromagnet).

In terms of claim 33, Lenhard et al. in view of Lenhard teach all of the claimed elements, including a set of transistors (13) connected to the electrical power supply, except for the sensor being a bipolar Hall effect probe. Hatanaka teaches in lines 40-48 of column 1, that if a magnetic field sensor is capable of determining magnetic field density irrespective of magnetic polarity (bipolar) of a magnet (or electromagnet), then is no longer necessary to manage the direction of the magnet when determining the position of the magnet. It would have been obvious to one of the ordinary skill in the art, at the time of the invention, to use the teachings of bipolar magnetic sensors as disclosed by Hatanaka to use a bipolar magnetic sensor (probe) in the device disclosed

by Lenhard et al. in order to determine a magnetic field irrespective of the polarity of a magnet (or electromagnet). It must be noted that, features of an apparatus may be recited either structurally or functionally, claims directed to an apparatus must be distinguished from the prior art in terms of structure rather than function. Therefore the functional recitation (paragraphs i and ii in claim 33) have not been given patentable weight as the prior art anticipates or makes obvious in combination, the structure of the apparatus.

10. Claims 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over the US Patent to Lenhard et al. (6,713,999) in view of the US Patent to Gary (4,639,665) further in view of the US Patent to Hatanaka (6,727,684) and further in view of the US Patent to Muller (4,535,275).

In terms of claim 18, Lenhard et al. in view of Gary and further in view of Hatanaka teach all of the claimed elements as discussed above except for the sensor output being a square wave. However, it is well known in the art to use Hall sensors that output square waves when such sensors are connected to transistors. For instance, Muller teaches in lines 9-15 of column 6, a hall element connected to transistors (as is the case in Lenhard et al. device) providing a square wave pulse that switches each transistor on or off. The "high" and "low" in the square wave, may also be termed 1-signal and 0-signal for convenience. It would have been obvious to one of the ordinary skill in the art, at the time of the invention, to use the teachings of square waves outputted from hall sensors as disclosed by Muller to use a square waveform at

the output of the sensor in Lenhard et al. device in order to conveniently turn on and off the transistors using "high" and "low" signals (also termed 1 and 0) which are easier to interpret and more defined than sinusoidal waveforms.

11. Claim 29, 30-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over the US Patent to Lenhard et al. (6,713,999) in view of the US Patent to Hatanaka (6,727,684).

As to claim 29, Lenhard et al. shows in Figure 1, an electrical power supply (V+, V-, 13, 14, 9 and 10) connected to the secondary winding (5+6), the power supply comprising transistors (13) configured in an H-configuration transistor bridge and freewheeling diodes (14), a controller (8) connected to the transistor bridge (13), freewheeling diodes (14), the power supply being supplied by a voltage (V+ and V-), a controller (8), connected to the transistor bridge, the controller arranged to provide closed loop mode regulation of current flowing in the secondary winding (the controller determined which switch 13-14 to turn on in order to control the current through windings 5 and 6 in a closed loop), the controller being controlled the probe (7). Lenhard et al. teaches all of the claimed elements except for the sensor being a bipolar Hall effect probe. Hatanaka teaches in lines 40-48 of column 1, that if a magnetic field sensor is capable of determining magnetic field density irrespective of magnetic polarity (bipolar) of a magnet (or electromagnet), then is no longer necessary to manage the direction of the magnet when determining the position of the magnet. It would have been obvious to one of the ordinary skill in the art, at the time of the invention, to use

the teachings of bipolar magnetic sensors as disclosed by Hatanaka to use a bipolar magnetic sensor (probe) in the device disclosed by Lenhard et al. in order to determine a magnetic field irrespective of the polarity of a magnet (or electromagnet).

It should be noted here that, while features of an apparatus may be recited either structurally or functionally, claims directed to an apparatus must be distinguished from the prior art in terms of structure rather than function. Therefore the functional recitation (paragraphs i and ii in claim 29) have not been given patentable weight as the prior art anticipates or makes obvious in combination, the structure of the apparatus.

As to claims 30-31, it appears the claims are aimed on describing a method of using the device claimed in claims 28-29. While features of an apparatus may be recited either structurally or functionally, claims directed to an apparatus must be distinguished from the prior art in terms of structure rather than function. Therefore, the functional recitations in claims 30 and 31 do not differentiate the claimed apparatus from the prior art and have not been considered.

Allowable Subject Matter

12. Claims 25 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

As to claim 25, the prior art of record does not teach alone or in combination, a device for measuring electric current including a temperature correction element in the

secondary winding connected in series with the measurement resistor, in combination with all other elements in claims 14 and 24.

Conclusion

13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. US Patent to Lenhard (6,177,791).

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Richard Isla-Rodas whose telephone number is (571) 272-5056. The examiner can normally be reached on Monday through Friday 8 am to 4:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ha Nguyen can be reached on (571) 272-1678. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Richard Isla-Rodas
November 21, 2006

VINH NGUYEN
PRIMARY EXAMINER
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11/22/06